

**Laboratory Data Consultants, Inc.
Data Validation Report**

Project/Site Name: Ballfields Parcels at DoDHF Novato, CA

Collection Date: April 4 through April 6, 2005

LDC Report Date: June 13, 2005

Matrix: Water

Parameters: Metals

Validation Level: NFESC Level III & IV

Laboratory: Columbia Analytical Services, Inc.

Sample Delivery Group (SDG): K2502571

Sample Identification

TO63-R3-GW01-ER
TO63-R3-GW01
TO63-R3-GW01-Dup
TO63-R4-GW01**
TO63-R5-GW01
TO63-R2-GW01
TO63-R1-GW01
TO63-SPN-GW01
TO63-RINSATE-02
TO63-RSP-GW01
TO63-RINSATE-01
TO63-R3-GW01MS
TO63-R3-GW01DUP
TO63-RSP-GW01DUP
TO63-R5-GW01MS
TO63-R5-GW01DUP

**|Indicates sample underwent NFESC Level IV review

Introduction

This data review covers 16 water samples listed on the cover sheet including dilutions and reanalysis as applicable. The analyses were per EPA SW 846 Methods 6010, 7000 and EPA Method 200.8 for Metals. The metals analyzed were Antimony, Arsenic, Barium, Beryllium, Cadmium, Chromium, Cobalt, Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Thallium, Vanadium, and Zinc.

The review follows the Final Sampling and Analysis Plan for Preliminary Assessment/Site Investigation of Ballfields Parcels at DoDHF Novato, California, (March 23, 2005) and a modified outline of the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review (February 1994) as there are no current guidelines for the methods stated above.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified a P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

Blanks are summarized in Section III.

Field duplicates are summarized in Section XIII.

Samples indicated by a double asterisk on the front cover underwent a NFESC Level IV review. A NFESC Level III review was performed on all of the other samples. Raw data were not evaluated for the samples reviewed by Level III criteria since this review is based on QC data.

The following are definitions of the data qualifiers:

- U Indicates the compound or analyte was analyzed for but not detected at or above the stated limit.
- J Indicates an estimated value.
- R Quality control indicates the data is not usable.
- N Presumptive evidence of presence of the constituent.
- UJ Indicates the compound or analyte was analyzed for but not detected. The sample detection limit is an estimated value.
- A Indicates the finding is based upon technical validation criteria.
- P Indicates the finding is related to a protocol/contractual deviation.
- None Indicates the data was not significantly impacted by the finding, therefore qualification was not required.

I. Technical Holding Times

All technical holding time requirements were met.

The chain-of-custodys were reviewed for documentation of cooler temperatures. All cooler temperatures met validation criteria.

II. Calibration

An initial calibration was performed.

The frequency and analysis criteria of the initial calibration verification (ICV) and continuing calibration verification (CCV) were met.

III. Blanks

Method blanks were reviewed for each matrix as applicable.

Data qualification by the initial, continuing and preparation blanks (ICB/CCB/PBs) was based on the maximum contaminant concentration in the ICB/CCB/PBs in the analysis of each analyte. No contaminant concentrations were found in the initial, continuing and preparation blanks with the following exceptions:

Method Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Antimony Chromium	0.009 ug/L 0.08 ug/L	All samples in SDG K2502571
ICB/CCB	Antimony Cobalt Copper Nickel Silver Thallium Vanadium Zinc	0.024 ug/L 6.0 ug/L 5.3 ug/L 0.15 ug/L 0.012 ug/L 0.013 ug/L 3.3 ug/L 2.6 ug/L	All samples in SDG K2502571

Sample concentrations were compared to the maximum contaminant concentrations detected in the ICB/CCB/PBs. The sample concentrations were either not detected or were significantly greater (>5X blank contaminants) than the concentrations found in the associated method blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
TO63-R3-GW01-ER	Antimony Chromium Nickel Silver Thallium	0.007 ug/L 0.08 ug/L 0.10 ug/L 0.005 ug/L 0.004 ug/L	0.007U ug/L 0.08U ug/L 0.10U ug/L 0.005U ug/L 0.004U ug/L
TO63-R3-GW01	Antimony (5x) Cobalt Silver (5x) Thallium (5x)	0.494 ug/L 22.9 ug/L 0.278 ug/L 0.300 ug/L	0.494U ug/L 22.9U ug/L 0.278U ug/L 0.300U ug/L
TO63-R3-GW01-Dup	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x)	0.249 ug/L 7.0 ug/L 14.6 ug/L 0.047 ug/L 0.084 ug/L	0.249U ug/L 7.0U ug/L 14.6U ug/L 0.047U ug/L 0.084U ug/L
TO63-R4-GW01**	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x)	0.228 ug/L 29.8 ug/L 15.4 ug/L 0.219 ug/L 0.116 ug/L	0.228U ug/L 29.8U ug/L 15.4U ug/L 0.219U ug/L 0.116U ug/L
TO63-R5-GW01	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x) Vanadium	0.259 ug/L 5.5 ug/L 13.4 ug/L 0.066 ug/L 0.079 ug/L 14.6 ug/L	0.259U ug/L 5.5U ug/L 13.4U ug/L 0.066U ug/L 0.079U ug/L 14.6U ug/L
TO63-R1-GW01	Antimony (5x) Cobalt Silver (5x) Thallium (5x)	0.255 ug/L 22.4 ug/L 0.163 ug/L 0.211 ug/L	0.255U ug/L 22.4U ug/L 0.163U ug/L 0.211U ug/L
TO63-SPN-GW01	Antimony (5x) Copper Silver (5x) Thallium (5x)	0.192 ug/L 22.4 ug/L 0.065 ug/L 0.113 ug/L	0.192U ug/L 22.4U ug/L 0.065U ug/L 0.113U ug/L
TO63-RINGSATE-02	Antimony Chromium Nickel Silver Zinc	0.007 ug/L 0.17 ug/L 0.28 ug/L 0.005 ug/L 3.6 ug/L	0.007U ug/L 0.17U ug/L 0.28U ug/L 0.005U ug/L 3.6U ug/L
TO63-RINSATE-01	Chromium Nickel Silver Zinc	0.16 ug/L 0.16 ug/L 0.004 ug/L 2.4 ug/L	0.16U ug/L 0.16U ug/L 0.004U ug/L 2.4U ug/L

IV. ICP Interference Check Sample (ICS) Analysis

The frequency of analysis was met with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
TO63-R4-GW01** TO63-R2-GW01	Molybdenum	This metal was not spiked in ICSAB.	This metal is potentially affected by common interferents and should be spiked in ICSAB.	J (all detects) UJ (all non-detects)	P

The criteria for analysis were met.

V. Matrix Spike Analysis

Matrix spike (MS) analyses were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Analyte	%R (Limits)	Flag	A or P
TO63-R3-GW01MS (All samples in SDG K2502571)	Antimony	37 (70-130)	J (all detects) UJ (all non-detects)	A

VI. Duplicate Sample Analysis

Duplicate (DUP) sample analyses were reviewed for each matrix as applicable. Results were within QC limits with the following exceptions:

DUP ID (Associated Samples)	Analyte	RPD (Limits)	Difference (Limits)	Flag	A or P
TO63-R3-GW01DUP (All samples in SDG K2502571)	Chromium	24 (\leq 20)	-	J (all detects) UJ (all non-detects)	A

VII. Laboratory Control Samples (LCS)

Laboratory control samples were reviewed for each matrix as applicable. Percent recoveries (%R) were within QC limits.

VIII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

IX. Furnace Atomic Absorption QC

Graphite furnace atomic absorption was not utilized in this SDG.

X. ICP Serial Dilution

ICP serial dilution analysis was performed by the laboratory. The analysis criteria were met.

XI. Sample Result Verification

All sample result verifications met validation criteria for samples on which a NFESC Level IV review was performed. Raw data were not evaluated for the samples reviewed by Level III criteria.

XII. Overall Assessment of Data

Data flags are summarized at the end of this report if data has been qualified.

XIII. Field Duplicates

Samples TO63-R3-GW01 and TO63-R3-GW01-Dup were identified as field duplicates. No metals were detected in any of the samples with the following exceptions:

Analyte	Concentration (ug/L)		RPD
	TO63-R3-GW01	TO63-R3-GW01-Dup	
Antimony	0.404	0.249	66
Arsenic	42.6	11.1	117
Barium	1740	198	159
Beryllium	1.8	0.4U	200
Chromium	119	19.4	144
Cobalt	22.9	7.0	106
Copper	145	14.6	163

Analyte	Concentration (ug/L)		RPD
	TO63-R3-GW01	TO63-R3-GW01-Dup	
Lead	98.9	9.540	165
Mercury	0.44	0.04U	200
Nickel	83.1	11.6	151
Silver	0.278	0.04	142
Thallium	0.300	0.084	112
Vanadium	207	24.8	157
Zinc	170	25.0	149
Molybdenum	9.5	9.0U	200

XIV. Field Blanks

Samples TO63-R3-GW01-ER, TO63-RINSATE-02, and TO63-RINSATE-01 were identified as equipment blanks. No metal contaminants were found in these blanks with the following exceptions:

Rinsate ID	Analyte	Concentration (ug/L)
TO63-R3-GW01-ER	Antimony Chromium Nickel Silver Thallium	0.007 0.08 0.10 0.005 0.004
TO63-RINSATE-02	Antimony Chromium Lead Nickel Silver Zinc	0.007 0.17 0.041 0.28 0.005 3.6
TO63-RINSATE-01	Chromium Nickel Silver Zinc	0.16 0.16 0.004 2.4

Ballfields Parcels at DoDHF Novato, CA
Metals - Data Qualification Summary - SDG K2502571

SDG	Sample	Analyte	Flag	A or P	Reason
K2502571	TO63-R4-GW01** TO63-R2-GW01	Molybdenum	J (all detects) UJ (all non-detects)	P	ICP interference check
K2502571	TO63-R3-GW01-ER TO63-R3-GW01 TO63-R3-GW01-Dup TO63-R4-GW01** TO63-R5-GW01 TO63-R2-GW01 TO63-R1-GW01 TO63-SPN-GW01 TO63-RINSATE-02 TO63-RSP-GW01 TO63-RINSATE-01	Antimony	J (all detects) UJ (all non-detects)	A	Matrix spike analysis (%R)
K2502571	TO63-R3-GW01-ER TO63-R3-GW01 TO63-R3-GW01-Dup TO63-R4-GW01** TO63-R5-GW01 TO63-R2-GW01 TO63-R1-GW01 TO63-SPN-GW01 TO63-RINSATE-02 TO63-RSP-GW01 TO63-RINSATE-01	Chromium	J (all detects) UJ (all non-detects)	A	Duplicate analysis (RPD)

Ballfields Parcels at DoDHF Novato, CA
Metals - Laboratory Blank Data Qualification Summary - SDG K2502571

SDG	Sample	Analyte	Modified Final Concentration	A or P
K2502571	TO63-R3-GW01-ER	Antimony Chromium Nickel Silver Thallium	0.007U ug/L 0.08U ug/L 0.10U ug/L 0.005U ug/L 0.004U ug/L	A
K2502571	TO63-R3-GW01	Antimony (5x) Cobalt Silver (5x) Thallium (5x)	0.494U ug/L 22.9U ug/L 0.278U ug/L 0.300U ug/L	A
K2502571	TO63-R3-GW01-Dup	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x)	0.249U ug/L 7.0U ug/L 14.6U ug/L 0.047U ug/L 0.084U ug/L	A

SDG	Sample	Analyte	Modified Final Concentration	A or P
K2502571	TO63-R4-GW01**	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x)	0.228U ug/L 29.8U ug/L 15.4U ug/L 0.219U ug/L 0.116U ug/L	A
K2502571	TO63-R5-GW01	Antimony (5x) Cobalt Copper Silver (5x) Thallium (5x) Vanadium	0.259U ug/L 5.5U ug/L 13.4U ug/L 0.066U ug/L 0.079U ug/L 14.6U ug/L	A
K2502571	TO63-R1-GW01	Antimony (5x) Cobalt Silver (5x) Thallium (5x)	0.255U ug/L 22.4U ug/L 0.163U ug/L 0.211U ug/L	A
K2502571	TO63-SPN-GW01	Antimony (5x) Copper Silver (5x) Thallium (5x)	0.192U ug/L 22.4U ug/L 0.065U ug/L 0.113U ug/L	A
K2502571	TO63-RINSATE-02	Antimony Chromium Nickel Silver Zinc	0.007U ug/L 0.17U ug/L 0.28U ug/L 0.005U ug/L 3.6U ug/L	A
K2502571	TO63-RINSATE-01	Chromium Nickel Silver Zinc	0.16U ug/L 0.16U ug/L 0.004U ug/L 2.4U ug/L	A

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/07/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-R3-GW01-ER

Lab Code: K2502571-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.050	0.006	1	4/28/05	5/2/05	0.007	B	N
Arsenic	200.8	0.50	0.09	1	4/28/05	5/2/05	0.09	U	
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	2.0	U	
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.4	U	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	0.20	0.06	1	4/28/05	5/2/05	0.08	B	*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	5.0	U	
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	4.0	U	
Lead	200.8	0.020	0.009	1	4/28/05	5/2/05	0.009	U	
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	0.20	0.06	1	4/28/05	5/2/05	0.10	B	
Selenium	200.8	1.0	0.4	1	4/28/05	5/2/05	0.4	U	
Silver	200.8	0.020	0.002	1	4/28/05	5/2/05	0.005	B	
Thallium	200.8	0.020	0.003	1	4/28/05	5/2/05	0.004	B	
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	3.0	U	
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	2.0	U	

% Solids: 0.0

Comments:

6/19/05

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/07/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-R3-GW01

Lab Code: K2502571-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.494	N	UJ
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	42.6		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	1740		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	1.8	B	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	J
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	119	*	U
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	22.9		U
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	145		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	98.9		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.44		
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.5	B	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	83.1		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	U
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.278		U
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.300		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	207		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	170		

% Solids: 0.0

Comments:

6/19/05

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute

Service Request: K2502571

Project No.: G486063

Date Collected: 04/07/05

Project Name: Novato Ballfields

Date Received: 04/08/05

Matrix: WATER

Units: µG/L

Basis: NA

Sample Name: TO63-R3-GW01-DUP

Lab Code: K2502571-003

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.249	B	N
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	11.1		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	198		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.4	U	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	19.4		*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	7.0	B	
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	14.6		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	9.540		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	11.6		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.047	B	
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.084	B	
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	24.8		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	25.0		

% Solids: 0.0

Comments:

6/19/05

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/07/05
 Date Received: 04/08/05
 Units: µg/L
 Basis: NA

Sample Name: TO63-R4-GW01

Lab Code: K2502571-004

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.228	B	N
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	30.0		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	72.2		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.7	B	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	31.1		*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	29.8		
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	15.4		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	9.280		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	93.7		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.219		
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.116		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	38.1		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	162		

% Solids: 0.0

Comments:

4/19/05

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METALS

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/07/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-R5-GW01

Lab Code: K2502571-005

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.259	N	J
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	16.2		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	26.5		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.4	U	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	20.6	*	J
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	5.5	B	u
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	13.4		u
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	3.950		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	31.5		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.066	B	
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.079	B	
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	14.6		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	23.7		

% Solids: 0.0

Comments:

Columbia Analytical Services

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METALS

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute

Service Request: K2502571

Project No.: G486063

Date Collected: 04/07/05

Project Name: Novato Ballfields

Date Received: 04/08/05

Matrix: WATER

Units: µG/L

Basis: NA

Sample Name: TO63-R2-GW01

Lab Code: K2502571-007

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.641	N	J
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	88.7		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	1130		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	6.1		
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	11.9		
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	320	*	J
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	155		
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	245		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	424		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.40		
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	UJ
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	453		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	4.1	B	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	1.770		
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	1.010		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	393		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	762		

% Solids: 0.0

Comments:

METALS

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute

Service Request: K2502571

Project No.: G486063

Date Collected: 04/07/05

Project Name: Novato Ballfields

Date Received: 04/08/05

Matrix: WATER

Units: µg/L

Basis: NA

Sample Name: TO63-R1-GW01

Lab Code: K2502571-008

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.255	N	J
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	5.20		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	384		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	1.1	B	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	J
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	62.8	*	U
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	22.4		X
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	36.5		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	22.1		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.13	B	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	81.4		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.163		
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.211		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	57.7		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	121		

% Solids: 0.0

Comments:

F6/kalcs

Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/05/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-SPN-GW01

Lab Code: K2502571-009

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.192	B	N
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	11.4		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	58.8		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.7	B	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.9		
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	40.1		*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	37.5		
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	22.4		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	13.9		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	203		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	2.0	U	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.065	B	
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.113		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	38.1		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	101		

% Solids: 0.0

Comments:

/G/19/05

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute

Service Request: K2502571

Project No.: G486063

Date Collected: 04/05/05

Project Name: Novato Ballfields

Date Received: 04/08/05

Matrix: WATER

Units: µG/L

Basis: NA

Sample Name: TO63-RINSATE-02

Lab Code: K2502571-010

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.050	0.006	1	4/28/05	5/2/05	0.007	B	N
Arsenic	200.8	0.50	0.09	1	4/28/05	5/2/05	0.09	U	
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	2.0	U	
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.4	U	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	0.20	0.06	1	4/28/05	5/2/05	0.17	B	*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	5.0	U	
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	4.0	U	
Lead	200.8	0.020	0.009	1	4/28/05	5/2/05	0.041		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	0.20	0.06	1	4/28/05	5/2/05	0.28		
Selenium	200.8	1.0	0.4	1	4/28/05	5/2/05	0.4	U	
Silver	200.8	0.020	0.002	1	4/28/05	5/2/05	0.005	B	
Thallium	200.8	0.020	0.003	1	4/28/05	5/2/05	0.003	U	
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	3.0	U	
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	3.6	B	

6/14/05

% Solids: 0.0

Comments:

Columbia Analytical Services

METALS

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INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/05/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-RSP-GW01

Lab Code: K2502571-011

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.250	0.030	1	4/28/05	5/2/05	0.838	J	N
Arsenic	200.8	2.50	0.45	1	4/28/05	5/2/05	33.0		
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	222		
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	1.2	B	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	1.00	0.30	1	4/28/05	5/2/05	108		*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	67.9		
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	57.5		
Lead	200.8	0.100	0.045	1	4/28/05	5/2/05	30.8		
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.32		
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	1.00	0.30	1	4/28/05	5/2/05	185		
Selenium	200.8	5.0	2.0	1	4/28/05	5/2/05	4.6	B	
Silver	200.8	0.100	0.010	1	4/28/05	5/2/05	0.349		
Thallium	200.8	0.100	0.015	1	4/28/05	5/2/05	0.336		
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	107		
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	141		

6/19/05

% Solids: 0.0

Comments:

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client: Battelle Memorial Institute
 Project No.: G486063
 Project Name: Novato Ballfields
 Matrix: WATER

Service Request: K2502571
 Date Collected: 04/04/05
 Date Received: 04/08/05
 Units: µG/L
 Basis: NA

Sample Name: TO63-RINSATE-01

Lab Code: K2502571-012

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Antimony	200.8	0.050	0.006	1	4/28/05	5/2/05	0.006	U	N
Arsenic	200.8	0.50	0.09	1	4/28/05	5/2/05	0.09	U	
Barium	6010B	5.0	2.0	1	4/21/05	4/22/05	2.0	U	
Beryllium	6010B	5.0	0.4	1	4/21/05	4/22/05	0.4	U	
Cadmium	6010B	5.0	5.0	1	4/21/05	4/22/05	5.0	U	
Chromium	200.8	0.20	0.06	1	4/28/05	5/2/05	0.16	B	*
Cobalt	6010B	10.0	5.0	1	4/21/05	4/22/05	5.0	U	
Copper	6010B	10.0	4.0	1	4/21/05	4/22/05	4.0	U	
Lead	200.8	0.020	0.009	1	4/28/05	5/2/05	0.009	U	
Mercury	7470A	0.20	0.04	1	4/11/05	4/13/05	0.04	U	
Molybdenum	6010B	10.0	9.0	1	4/21/05	4/22/05	9.0	U	
Nickel	200.8	0.20	0.06	1	4/28/05	5/2/05	0.16	B	
Selenium	200.8	1.0	0.4	1	4/28/05	5/2/05	0.4	U	
Silver	200.8	0.020	0.002	1	4/28/05	5/2/05	0.004	B	
Thallium	200.8	0.020	0.003	1	4/28/05	5/2/05	0.003	U	
Vanadium	6010B	10.0	3.0	1	4/21/05	4/22/05	3.0	U	
Zinc	6010B	10.0	2.0	1	4/21/05	4/22/05	2.4	B	

6/10/05

% Solids: 0.0

Comments:

LDC #: 13575D4

VALIDATION COMPLETENESS WORKSHEET

Date: 6-8-05

SDG #: K2502571

Level III/IV

Page: 1 of 1

Laboratory: Columbia Analytical Services

Reviewer: MG

2nd Reviewer: JMA

METHOD: Metals (EPA SW 846 Method 6010B/7000) / 200.8

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Technical holding times	A	Sampling dates: 4-4-05 through 4-6-05
II.	Calibration	A	
III.	Blanks	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	SW	
V.	Matrix Spike Analysis	SW	MS
VI.	Duplicate Sample Analysis	SW	DUP
VII.	Laboratory Control Samples (LCS)	A	LCS
VIII.	Internal Standard (ICP-MS)	A	
IX.	Furnace Atomic Absorption QC	N	Not utilized
X.	ICP Serial Dilution	A	
XI.	Sample Result Verification	A	Not reviewed for Level III validation.
XII.	Overall Assessment of Data	A	
XIII.	Field Duplicates	SW	D = 2 + 3
XIV.	Field Blanks	SW	EB = 1, 9, 11

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet

ND = No compounds detected
 R = Rinsate
 FB = Field blank

D = Duplicate
 TB = Trip blank
 EB = Equipment blank

Validated Samples: ** Indicates sample underwent Level IV validation

all water

1	TO63-R3-GW01-ER	11	TO63-RINSATE-01	21		31	
2	TO63-R3-GW01	12	TO63-R3-GW01MS	22		32	
3	TO63-R3-GW01-Dup	13	TO63-R3-GW01DUP	23		33	
4	TO63-R4-GW01**	14	TO63-RSP-GW01DUP	24		34	
5	TO63-R5-GW01	15	TO63-R5-GW01 MS	25		35	
6	TO63-R2-GW01	16	TO63-R5-GW01 DUP	26		36	
7	TO63-R1-GW01	17	PBW	27		37	
8	TO63-SPN-GW01	18		28		38	
9	TO63-RINSATE-02	19		29		39	
10	TO63-RSP-GW01	20		30		40	

Notes: _____

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: MG
2nd Reviewer: JY

Method: Metals (EPA SW 826 Method 6010/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury and 85-115% for cyanide) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995 ?	✓			
Was a midrange cyanide standard distilled?			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
IV. ICP Interference Check Sample				
Were ICP interference check samples performed daily?		✓		
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
V. Matrix Spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) $\leq 20\%$ for water and $\leq 35\%$ for soil samples? A control limit of +/- RL (+/-2X RL for soil) was used for samples that were $\leq 5X$ the RL, including when only one of the duplicate sample values were $\leq 5X$ the RL.		✓		
VI. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			
VII. Furnace Atomic Absorption QC				
If MSA was performed, was the correlation coefficients > 0.995 ?			✓	
Do all applicable analyses have duplicate injections?			✓	

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: MG
2nd Reviewer: JH

Validation Area	Yes	No	NA	Findings/Comments
For sample concentrations > RL, are applicable duplicate injection RSD values < 20%?			✓	
Were analytical spike recoveries within the 85-115% QC limits?			✓	
VII. ICP Serial Dilution:				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the IDL?	✓			
Were all percent differences (%Ds) ≤ 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
VIII. Internal Standards (EPA-SW-846 Method 6020)				
Were all the percent recoveries (%R) within the 90-120% of the intensity of the internal standard in the associated initial calibration? <i>60 - 125</i>	✓			
If the %Rs were outside the criteria, was a reanalysis performed?			✓	
IX. Regional Quality Assurance and Quality Control:				
Were performance evaluation (PE) samples performed?		✓		
Were the performance evaluation (PE) samples within the acceptance limits?			✓	
X. Sample Result Verification:				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data:				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates:				
Field duplicate pairs were identified in this SDG.	✓			
Target analytes were detected in the field duplicates.	✓			
XIII. Field blanks:				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET

Sample Specific Element Reference

Page: 1 of 1
Reviewer: MG
2nd reviewer: MN

All circled elements are applicable to each sample.

Comments: Mercury by CVAA if performed

**Ballfields Parcels at DoDHF Novato, CA
Gasoline Range Organics - Data Qualification Summary - SDG K2502499**

No Sample Data Qualified in this SDG

**Ballfields Parcels at DoDHF Novato, CA
Gasoline Range Organics - Laboratory Blank Data Qualification Summary - SDG
K2502499**

SDG	Sample	Compound	Modified Final Concentration	A or P
K2502499	TO63-R1-SB02-0-0.5	Gasoline range organics	3.3U mg/Kg	A
K2502499	TO63-R1-SB01-0-0.5Dup	Gasoline range organics	3.3U mg/Kg	A

LDC #: 13575 D4
 SDG #: K2502571
 METHOD: Trace Metals (EPA SW 846 Method 6010/7000) Soil preparation factor applied: N/A
 Sample Concentration units, unless otherwise noted: µg/L

VALIDATION FINDINGS WORKSHEET
 PB/ICB/CCB QUALIFIED SAMPLES

Page: 1 of 1
 Reviewer: MG
 2nd Reviewer: LM

Analyte	Maximum PB* (mg/Kg)	Maximum PB* (µg/L)	Maximum CCB/CCB* (µg/L)	Sample Identification								
				1	2	3	4	5	6	7	8	9
Al												
Sb	0.009	0.024	0.12	0.007	5×d ₁ 0.494	5×d ₁ 0.249	5×d ₁ 0.228	5×d ₁ 0.259	5×d ₁ 0.255	5×d ₁ 0.192	0.007	
As												
Ba												
Be												
Cd												
Ca												
Cr	0.08	0.40	0.08									
Cc	6.0	30.0	22.9	7.0	29.8	5.5	22.4					
Cu	5.3	36.5		14.6	15.4	13.4	22.4					
Fe												
Pb												
Mg												
Mn												
Hg												
Ni	0.15	0.75	0.10									
K												
Se	0.012	0.060	0.005	5×d ₁ 0.278	5×d ₁ 0.047	5×d ₁ 0.219	5×d ₁ 0.066	5×d ₁ 0.163	5×d ₁ 0.055	0.005	0.004	
Ag												
Na	0.013	0.065	0.004	5×d ₁ 0.300	5×d ₁ 0.084	5×d ₁ 0.116	5×d ₁ 0.079	5×d ₁ 0.311	5×d ₁ 0.113			
Tl	3.3	16.50										
V	2.6	13.00										
Zn												
B												
Mo												
Sr												

Samples with analyte concentrations within five times the associated ICB, CCB, or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
 Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET

ICP Interference Check Sample

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A Were ICP interference check samples performed as required?

Were the AB solution percent recoveries (%R) within the control limits of 80-120% ?

LEVEL IV ONLY:

#	Date	ICs Identification	Analyte	Finding	Associated Samples	Qualifications
1	No ICSAB	Mo	Not spiked	1→3, 5, 7→11 (<90%)	No Qvarl	
2				4, 6 (Fe >90%)	J/UJ/P	

Comments:

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET

Matrix Spike Analysis

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a matrix spike analyzed for each matrix in this SDG?
Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 2 or more, was the sample rejected as a result?

Y/N/N/A

LEVEL IV ONLY:

LEVEL IV ONLY: Y N NA Was a post digestion spike analyzed for ICP elements that did not meet the required criteria for recalculation? See Level IV Recalculation Worksheet for recalculations.

Page: 1 of 1
Reviewer: MG
2nd Reviewer:

#	Matrix Spike ID	Matrix	Analyte	%R	Associated Samples	Qualifications
1	12	water	Sb	37 (70-130)	all	J/UJ/A

Comments:

LDC #: 13575D4
SDG #: W2503571

VALIDATION FINDINGS WORKSHEET

Duplicate Analysis

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Page: 1 of 1
Reviewer: MG
2nd Reviewer: WV

VALIDATION FINDINGS WORKSHEET

Duplicate Analysis

Please see qualif.
Y N N/A
Y (N) N/A

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Was a duplicate sample analyzed for each matrix in this SDG?

Was a duplicate sample analyzed for each matrix in this SDG?

Was a duplicate sample analyzed for each matrix in this SDG? Were all duplicate sample relative percent differences (RPD) $\leq 20\%$ for water samples and $\leq 35\%$ for soil samples? If no, see qualifications below. A control limit of $\pm R.L.$ ($\pm 2X R.L.$ for soil) was used for sample values that were $<5X$ the R.L., including the case when only one of the duplicate sample

LEVEL IV ONLY:

#	Duplicate ID	Matrix	Analrite	RPD (Limits)	Difference (Limits)	Associated Samples	Qualifications
1	13	Water	As Cr Pb Ni	19 ($\leq +5$) 24 (≤ 20) 17 20	att	J105A J105/A	

Comments:

DJP.4S2

LDC#: 13575D4
SDG#: K2502571

VALIDATION FINDINGS WORKSHEET
Field Duplicates

Page: 1 of 1
Reviewer: MG
2nd Reviewer: my

METHOD: Metals (EPA Method 6010B/7000)

NA

Were field duplicate pairs identified in this SDG?

NA

Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ug/L)		RPD	
	2	3		
Antimony	0.494	0.249	66	
Arsenic	42.6	11.1	117	
Darium	1740	198	159	
Beryllium	1.8	0.4U	200	
Chromium	119	19.4	144	
Cobalt	22.9	7.0	106	
Copper	145	14.6	163	
Lead	98.9	9.540	165	
Mercury	0.44	0.04U	200	
Nickel	83.1	11.6	151	
Silver	0.278	0.047	142	
Thallium	0.300	0.084	112	
Vanadium	207	24.8	157	
Zinc	170	25.0	149	
Molybdenum	9.5	9.0U	200	

LDC #: 13575 D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 2
Reviewer: MG
2nd reviewer: MH

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

- N N/A Were field blanks identified in this SDG?
 N N/A Were target analytes detected in the field blanks?

Sample: _____ | Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Analyte	Concentration Units ($\mu\text{g/L}$)
Sb	0.007
Cr	0.08
Ni	0.10
Ag	0.005
Tl	0.004

Sample: 9 Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Analyte	Concentration Units ($\mu\text{g/L}$)
Sb	0.007
Cr	0.17
Pb	0.041
Ni	0.28
Ag	0.005
Zn	3.6

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET

Field Blanks

Page: 2 of 2
Reviewer: MG
2nd reviewer: JM

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

N N/A Were field blanks identified in this SDG?
 N N/A Were target analytes detected in the field blanks?

Sample: 11 Field Blank / Trip Blank / Rinsate / Other EB (circle one)

Sample: _____ **Field Blank / Trip Blank / Rinsate / Other** _____ **(circle one)**

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Verification

Page: 1 of 1
Reviewer: MG
2nd Reviewer: MJ

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found}}{\text{True}} \times 100$$

Where Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated		Reported %R	Acceptable (Y/N)
					%R	Reported		
0946 ICV	ICP (Initial calibration)	Cd	1211	1250	97	97	Y	
0837 ICV	GFAA (Initial calibration) ICP-MS	Ag	12.24	12.5	98	98		
1611 ICV	CVAA (Initial calibration)	Hg	5.14	5.0	103	103		
1141 CCV5	ICP (Continuing calibration)	V	499.3	500	100	100		
0924 CCV2	GFAA (Continuing calibration) ICP-MS	Cr	24.82	25.0	99	99		
1633 CCV2	CVAA (Continuing calibration)	Hg	4.94	5.0	99	99		
	Cyanide (Initial calibration)							
	Cyanide (Continuing calibration)							

Comments: Refer to Calibration Verification findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: MG
2nd Reviewer: AM

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:
$$\%R = \frac{\text{Found}_{\text{True}}}{\text{True}} \times 100$$

Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation,
Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$$\text{RPD} = \frac{|S_{\text{D}} - D|}{(S + D)/2} \times 100$$

Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$$\%D = \frac{|I - SDR|}{I} \times 100$$

Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading \times 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated	Reported	Acceptable (%N)
1003	ICP Interference check	Ba	476.6 ($\mu\text{g/L}$)	500 ($\mu\text{g/L}$)	95	95	Y
1130	Laboratory control sample	Mo	990.3 ($\mu\text{g/L}$)	1000 ($\mu\text{g/L}$)	99	99	
1139	Matrix spike	Cu	239.5 ($\mu\text{g/L}$)	250 ($\mu\text{g/L}$)	96	96	
0854/0857	Duplicate	As	8.519 ($\mu\text{g/L}$)	10.35 ($\mu\text{g/L}$)	19	19	
13		Zn	169.7 ($\mu\text{g/L}$)	175.5 ($\mu\text{g/L}$)	3	3	
1130/1137	ICP serial dilution						
3							

Comments: Refer to appropriate worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 13575D4
SDG #: K2502571

VALIDATION FINDINGS WORKSHEET

Sample Calculation Verification

Page: 1 of 1
Reviewer: MG
2nd reviewer: MV

METHOD: Trace Metals (EPA SW 846 Method 6010/7000)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Have results been reported and calculated correctly?

Are results within the calibrated range of the instruments and within the linear range of the ICP?

Are all detection limits below the CRDL?

Detected analyte results for #4, Sb were recalculated and verified using the following equation:

Concentration =	$\frac{(RD)(FV)(Dil)}{(In. Vol.)(\%S)}$
RD =	Raw data concentration
FV =	Final volume (ml)
In. Vol. =	Initial volume (ml) or weight (G)
Dil =	Dilution factor
%S =	Decimal percent solids

Recalculation:

$$\frac{(0.0457 \text{ mg/L})(0.050 \text{ L})}{0.010 \text{ L}} = 0.2285 \text{ mg/L}$$